

# Cement Concrete Tiles and Paving Blocks

PRODUCT CODE	: 94459
QUALITY AND STANDARDS	: N.A.
PRODUCTION CAPACITY	: Quantity: 1200 Tonnes (per annum) Value : Rs.22, 00, 000
MONTH AND YEAR OF PREPARATION	: February, 2003
PREPARED BY	: Small Industries Service Institute, Rajajinagar Industrial Estate, Bangalore - 560 044 Phone Nos.: 080 - 3351581, 3351582 Fax No.: 080 - 3351583 E - mail: sisibng@vsnl.com

## INTRODUCTION

Cement concrete tiles and paving blocks are precast solid products made out of cement concrete. The product is made in various sizes and shapes viz. rectangular, square and round blocks of different dimensions with designs for interlocking of adjacent tiles blocks. The raw materials required for manufacture of the product are portland cement and aggregates which are available locally in every part of the country.

## MARKET POTENTIAL

Cement concrete tiles and paving blocks find applications in pavements, footpaths, gardens, passenger waiting sheds, bus-stops, industry and other public places. The product is commonly used in urban areas for the above

applications. Hence, the unit may be set up in urban and semi-urban areas, near the market.

A lot of face-lift is being given to roads, footpaths along the roadside. Concrete paving blocks are ideal materials on the footpaths for easy laying, better look and finish. Whereas the tiles find extensive use outside the large building and houses, lots of these materials are also used in flooring in the open areas of public offices and commercial buildings and residential apartments.

## BASIS AND PRESUMPTIONS

*Efficiency:* It is envisaged that the unit will run on one shift a day for 25 days in a month or 300 days in a year. 75 percent efficiency of machinery and manpower is considered.

*Time Period:* Full capacity utilization is expected to be achieved within 12 months of commencement of commercial production.

*Labour Wages:* Minimum applicable wages are considered.

*Interest Rate:* An interest rate of 14% per annum on the total capital investment has been considered.

*Margin Money:* Promoter is expected to bring in 25% of the total capital investment.

*Pay Back Period:* The project will have a payback period of about 3-4 years.

*Land and Construction Cost:* Land cost is considered at Rs. 500 per square meter, and Construction cost for office and stores at Rs. 2000 per square meter, and work shed at Rs. 1500 per square meter.

## IMPLEMENTATION SCHEDULE

Sl. No.	Activity	Period
1.	Preparation of the project report, selection of site, provisional registration from DIC, availability of finance	2 months
2.	Construction of building, procurement of machinery and equipment, availability of electrical power	3 months
3.	Erection and commissioning, recruitment of manpower, trial runs and commencement of commercial production	1 month
Total implementation period		6 months.

## TECHNICAL ASPECTS

### Process of Manufacture

Cement concrete is a mixture of portland cement, aggregates (sand and stone chips) and water. Aggregates passing through 4.7 mm IS sieve are known as fine aggregates and the aggregates retained on this sieve are coarse aggregates.

The process of manufacture of cement concrete paving blocks involves the following steps:

- a) Proportioning
- b) Mixing
- c) Compacting
- d) Curing
- e) Drying

A concrete mix of 1:2:4 (cement: sand: stone chips) by volume may be used for cement concrete paving blocks with water to cement ratio of 0.62. The concrete mix should not be richer than 1:6 by volume of cement to combined aggregates before mixing. Fineness modules of combined aggregates should be in the range of 3.6 to 4.0.

All the raw materials are placed in a concrete mixer and the mixer is rotated for 15 minutes. The prepared mix is discharged from the mixer and consumed in the next 30 minutes. Vibrating table may be used for compacting the concrete mix in the moulds of desired sizes and shapes. After compacting the blocks are demoulded and kept for 24 hours in a shelter away from direct sun and winds.

The blocks thus hardened are cured with water to permit complete

moisturisation for 14 to 21 days. Water in the curing tanks is changed every 3 to 4 days. After curing, the blocks are dried in natural atmosphere and sent for use.

The concrete paving blocks gain good strength during the first 3 days of curing and maximum gains in strengths are secured in the first 10 to 15 days of curing. After curing, blocks are allowed to dry in shade so that the initial shrinkage of the blocks is completed before they are used in the work. A drying period of 7 to 15 days would normally complete the drying shrinkage after which they can be used. The concrete tiles are similarly produced with the help of semi-dry pressing of the mixture and allowed to set for 24-36 hours. It is cured in the tanks for 15 days. If need be water can also be sprinkled to gain maximum physical strength in 15-21 days.

### Quality Control and Standards

#### a) Indian Standard Specification

There is no Indian Standard Specification specifically on cement concrete paving blocks. However, the specifications laid down in IS 2185 (Part 1) Specification for concrete masonry units: Part 1 for Hollow and Solid concrete blocks, may be used as general guidelines for meeting the quality parameters, since the paving blocks are also essentially solid cement concrete blocks.

#### b) Quality Requirements

Proportioning of raw materials, mixing, compacting, curing and drying are the important stages of manufacture.

Quality parameters like actual proportion of the individual raw materials, ratio of coarse aggregates to fine aggregates, water to cement ratio, good finish, accuracy in size and shape and compression strength after curing are the some of the important parameters that should be checked periodically to ensure good quality of the product.

### Production Capacity (per annum)

Quantity: 800 tonnes

Value: Rs. 22, 00, 000

Motive Power 10HP.

### Pollution Control

Dust collecting unit is required to be installed at the mixing and raw material handling section. The workers may use dust masks.

### Energy Conservation

General maintenance of the machine and drive system can be employed for saving energy.

## FINANCIAL ASPECTS

### A. Fixed Capital

#### (i) Land and Building

Particulars	Sq. Meters	Rate (Rs.)	Value (Rs.)
Land	400	500	2,00,000
Built up Area			
Office and Stores	50	2,000	1,00,000
Working Shed	150	1,500	2,25,000
		Total	5,25,000

## (ii) Machinery and Equipments

Description	Imp/ Ind.	Qty. (Nos.)	Rate (Rs.)	Value (Rs.)
<i>Production Unit</i>				
Concrete mixer: capacity 10cft/7cft with 3 hp motor, speed of the mixer drum 20 rpm, and other accessories	Ind.	1	75,000	75,000
Hydraulically operated Concrete block making machine: capacity 1500 blocks per shift, with pressure vibration technique for compaction, 3 HP motor, and other accessories	Ind.	1	1,25,000	1,25,000
Mechanical tile melting press with 7HP motor		1	45,000	45,000
Construction of curing tanks	Ind.	2	12,500	25,000
Mould tools, etc.	Ind.	LS		25,000
Water pump set	Ind.	1	25,000	25,000
Cost of erection, installation and electrification, at 10% of the above				32,000
Cost of office equipment, furniture etc.				47,500
				Total 3,95,000

## (iii) Pre-Operative Expenses (per month) (Rs.)

Project report cost, non-refundable deposits, etc.	25,000
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(iv) Total Fixed Capital (i+ii+iii) 9,45,000

## B. Working Capital (Per Month)

## (i) Personnel (per month)

Designation	No.	Salary (Rs.)	Total (Rs.)
<i>Administration and Supervisory personnel</i>			
Supervisor	1	5,000	5,000
Clerk	1	3,000	3,000
Watchman	1	2,000	2,000
<i>Technical: Skilled and Semi or Unskilled personnel</i>			
Skilled Workers	2	2,500	5,000
Unskilled workers	8	1,800	14,400
<i>Perquisites @15% of the above</i>			4,410
Total cost of Salaries and wages			33,810

## (ii) Raw Materials (per month)

Particulars	Imp/ Ind.	Qty. Unit	Rate (Rs.)	Value (Rs.)
Portland cement	Ind.	15 Tonnes	3,200	48,000
Sand	Ind.	35 Tonnes	250	8,750

Particulars	Imp/ Ind.	Qty. Unit	Rate (Rs.)	Value (Rs.)
Stone chips	Ind.	70 Tonnes	300	21,000
				Total 77,750

## (iii) Utilities (per month)

Particulars	Qty. (Rs.)	Unit	Rate (Rs.)	Value (Rs.)
Electrical Power	500	kWH	4	2,000
Water	100	Kiloliters	20	2,000
				Total 4,000

## (iv) Other Contingent Expenses (per month)

Particulars	Value (Rs.)
Postage and Stationery	500
Telephone	500
Consumable stores	2,000
Repairs and maintenance	1,500
Transport Charges	1,500
Advertisement and Publicity	1,000
Insurance	500
Taxes	500
Sales Expenses	1,500
Miscellaneous Expenses	500
	Total 10,000

Particulars	Value (Rs.)
Total Recurring Expenditure (per month) (i + ii + iii + iv)	1,25,560
Total Working capital (on 3 months basis)	3,76,680

### C. Total Capital Investment

(i) Total Fixed Capital	Rs. 9,45,000
(ii) Total working Capital	Rs. 3,76,680
Total	Rs. 13,21,680

### MACHINERY UTILISATION

Machinery utilisation of 75% has been considered in the project

### FINANCIAL ANALYSIS

#### (1) Cost of Production (per year)

Description	Value (Rs.)
Total recurring cost	15,06,720
Depreciation on building @ 5%	16,250
Depreciation on Machinery and Equipment @ 10%	29,500
Depreciation on office equipment, mould etc. @ 20%	13,600
Interest on capital investment @ 14%	1,85,035
Total	17,51,105
or Say	17,51,100

#### (2) Sales Turnover (per year)

Item	Qty	Unit	Rate (Rs.)	Value (Rs.)
Cement concrete paving blocks	800	Tonnes	1,800	14,40,000
Cement Concrete Tiles	400	Tonnes	1,900	7,60,000
Total				22,00,000

#### (3) Net Profit (before tax) (2 - 1)

Rs. 22,00,000 - 17,51,100 = Rs. 4,48,945

#### (4) Net Profit Ratio

$$\begin{aligned}
 &= \frac{\text{Net Profit per year} \times 100}{\text{Sales Turnover per year}} \\
 &= \frac{4,48,900 \times 100}{22,00,000} \\
 &= 20.40\%
 \end{aligned}$$

#### (5) Rate of Return (percent)

$$\begin{aligned}
 &= \frac{\text{Net Profit per year} \times 100}{\text{Total Capital investment}} \\
 &= \frac{4,48,900 \times 100}{13,21,680} \\
 &= 33.96\%
 \end{aligned}$$

#### (6) Break Even Point

Fixed Cost	Value (Rs.)
Total depreciation	59,350
Interest on total capital investment	1,85,035
Insurance	6,000
40% of Salaries and wages	1,62,288
40% of other contingent expenses (excluding insurance)	45,600
Total	4,58,273

#### B.E.P.

$$\begin{aligned}
 &= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Net Profit}} \\
 &= \frac{4,58,273 \times 100}{4,58,273 + 4,48,900} \\
 &= 50\%
 \end{aligned}$$

### Addresses of Machinery and Equipment Suppliers

1. M/s. Engineers Enterprises  
189, Bharathiyar Road,  
Ganapathy  
Maniyakaranpalayam Road,  
Near IEC Bus Stop, Ganapathy  
Coimbatore - 641 006  
(Tamil Nadu)  
Phone: 91-0422-530639, 530788,  
and 532260,  
Fax: 91-0422-532260, 531893
2. M/s. Victor Electrical and  
Machinery Manufactures  
3616, Netaji Subash Marg,  
Daryaganj, New Delhi - 110 002  
Phone: 23263118, 23265823
3. M/s. Buildtech Engineering Co.  
Shree Ashadweep Complex,  
16-Civil Lines, Roorkee - 247 667,

- (Uttar Pradesh)  
Phone/Fax: 01332-73443
4. M/s. Karthik Industries  
36, J.C. Road, Bangalore-560 002  
Phone: 91-80-2224825,  
2235218; 2233739  
Fax: 91-80-2213703  
E-mail:  
karthikengineering@vsnl.com.
  5. M/s. Susanji Udyog Pvt. Ltd.  
C-47, Industrial Estate,  
Sanathnagar,  
Hyderabad - 500 018  
Phone: 3704194, 3711464  
E-mail: susanji@satyam.net.in
  6. M/s. Apco Concrete Blocks and  
Allied Products  
7th Mile, Kanakpura Road,  
Doddasandra Post  
Bangalore - 560 062
  7. M/s. Ashok Engineering Works  
81, Ajit Industrial Estate Rakhial,  
Ahmedabad - 380 023
  8. M/s. Hydro Engineering Works  
K1/116, CIDC, Mori, (Gujarat)

#### Raw Material Suppliers

Local suppliers and dealers available for cement and aggregates like sand and stone chips.